A critical appraisal of "Balance Training Exercises Decrease Lower-Limb Strength Asymmetry in Young Tennis Players"

By

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Abstract

A critical appraisal written in review of the article "Balance Training Exercises Decrease Lower-Limb Strength Asymmetry in Young Tennis Players" and its ability to answer the following clinical question: In young tennis players, is balance training more effective than sport specific training in prevention of injury? The quality and validity of the introduction, methods, results, and discussion are assessed. The strengths and weakness of the intervention are evaluated to ascertain if it will be suitable for clinical use. The study concludes that balance training produces many benefits that improve lower-limb functional asymmetries leading to an increased chance of injury in young athletes. Critically appraising articles such as this one is important to continue high quality research in the field of physical therapy.

Key words

Balance training, sport specific training, young athletes, tennis, strength asymmetries

Introduction

Injury prevention does not get as much attention in the world of research as does rehabilitation methods. As physical therapists, our goal is to rehabilitate patients back to their prior level of function when possible. Naturally, this means that looking for ways to prevent injury would not be as important. Injury prevention should be a desire for any physical therapist looking out for their patient's best interests. An area of study that has caught the attention of researchers is lower-limb functional asymmetries in young athletes. Lower-limb functional asymmetries are being correlated with a high chance of injury. Critically appraising the research completed on this topic is important, as it will ensure that athletes being treated by physical therapists will receive the best care possible. The critical appraisal of this topic is in response to the following question: In young tennis players, is balance training more effective than sport specific training in prevention of injury?

Methods

To search for articles the data bases Pubmed and Cinhalcomplete were used. The key words used in the search to narrow down the results were "tennis players", "balance training", and "sport specific". Three limits were placed on the search, which included the need for the articles to be either a clinical control trial, a randomized control trial, or published within the last ten years. These limits were applied to ensure that the articles found were written about studies that were experiment based and relevant to athletes today. The inclusion and exclusion criteria required that the article be written in English, the study needed to be conducted on humans, and also needed to involve tennis players. The article had to be written in English for the information to be understood fully. On a similar note, the study needed to be over a human trial as any information coming from an animal study would not be applicable to athletes. The requirement

for the study to involve tennis players stems from the original clinical question posed. Five articles were found in the Pubmed data base and four articles were found in Cinhalcomplete.

The article chosen for this appraisal was published in the Journal of Sports Science and Medicine in 2014. The authors of this article are Italo Sannicandro, MSc, MD, Giacomo Cofano, MSc, MD, Anna R. Rosa, MSc, MD, and Andrea Piccinno, MSc, MD. All the authors are faculty in the Department of Clinical and Experimental Medicine at the University of Foggia, Italy. I chose this article due to the fact that it met many of the criteria that make an article credible. This article randomly assigned its subjects to two groups, an experiment group and a comparison group. The article also used subjects that had similar sociodemographic, clinical, and prognostic characteristics. This study also did a good job of having a good ratio of boys to girls. All tests to measure the outcomes are reliable.

Results

Summary of the study

This article is based on the premise that if you decrease lower-limb strength asymmetry you will decrease the risk of injury in tennis athletes. The study takes a group of young tennis players and breaks them up into two groups, the experiment group and the comparison group. The experiment group is put through a training regiment of balance-oriented exercises twice a week for six weeks. The comparison group is put through a sport specific training regiment twice a week for six weeks. Both groups are evaluated by the one hop leg test, side hop test 10 and 20m sprint tests, Foran test, and side steps and forward 4.115-m test. These tests are administered before the first training session, the second training session, the second to last session, and the last training session. Significant effects of training were only found in the

experiment group and it was concluded that balance training was effective in decreasing lower-limb asymmetry and therefore decreasing the risk of injury.

Appraisal of the study introduction

The introduction to this paper does a very good job of explaining functional asymmetries and why it is important that we try to eliminate them. The reader is able to get a good scope of what the study is about and how the authors are going to prove or disprove their hypothesis. The critical variables have also been well addressed. For example, the introduction explains what strength asymmetry means and what balance training consists of. The development of strength asymmetries is explained as well as the effect on athletes. The study utilizes ample amount of references, which are mostly current and published by reputable journals.

Unfortunately, some of the literature used to support this study is out of date. The out of date literature does come from reputable journals but it is too old to be considered relevant to the current study being performed. One other weakness to the introduction is the lack of a clear definition concerning sport specific drills. In order for the reader to be fully informed on the study this piece needs to be added.

Appraisal of the study methods

The research design for this study is a randomized control trial. The study is prospective and cross-sectional. Twenty-three subjects were recruited and no mention of subject attrition is made. There are two groups employed in this study. A control group that does sport specific training and an experimental group that performs balance training. The study is a between-subjects design. The groups have similar sociodemographic, clinical, and prognostic characteristics and as a result all subjects are about the same age and have very similar scores for their first assessment. Both the control group and

the experimental group are managed the same way as each met twice a week for thirty minutes with the only difference being the experimental interventions between groups. The interventions for balance training are described clearly and could be easily replicated.

The major weakness of this study is that neither the subjects nor the clinicians in the study are blinded to which group each subject is assigned to. This is assumed as no mention of an effort to blind the subjects or the clinicians is made. As a result, there is potential for bias in the results of this study. Another weakness is the lack of a clear exercise program for the control trial. The article states that the control group performs tennis specific drills but does not give a list of those drills and for how long they were performed. Replicating this part of the study would be very difficult due to the omission. The outcome measures for this study are mentioned however they are not clearly explained. Each outcome measure has a reference for the reader to continue an investigation into the validity and reliability of the measure but the authors fail to explain why each outcome measure is chosen for this study. The procedure for data collection is also not present in the methods.

Appraisal of the study results

The results for this study are clear, organized, and address the research question. The table of results is easy to read and decipher. The threshold of p value that is considered statistically significant and the parameter for confidence intervals are stated. The statistically significant results are listed as well. The results appear to be clinically meaningful as a clear improvement is made in the experimental group while the control group actually worsened in performance.

The results section for this study does not mention any specific results from the outcome measures in the text but only addresses them in the tables. To some this is seen as a weakness.

No mention of a minimal clinically important difference (MCID) or number needed to treat (NNT) is made.

Appraisal of the study discussion

In order to remind the reader of the hypothesis, it is stated at the beginning of the discussion so there is no confusion. The authors did well to not repeat any of the results but instead explain the meaning of their findings and even compare their study to prior studies. A comparison of the data is made and found to be similar. The conclusions drawn are reflective of the results and are not over concluded.

Some of the literature used to validate the discussion is almost fifteen years old rendering it out of date. This hampers the credibility of the article under review in this critical appraisal. No mention of any limitations for this article is made. The authors mention the need for more research in the topic of balance training vs. sport specific training but no formal study is proposed. The authors also did not specifically address the clinical significance or application of the study but they do speak to how this study and method of training are important for young athletes and possibly for athletes across the board.

Discussion

As physical therapists we are always trying to improve our practice. We mainly assist patients in returning from injury but more and more physical therapists are starting to reach into the injury prevention side of medicine. This article lays out a solution to a common problem in young tennis players. Due to the repetitive nature of tennis many players can develop strength asymmetries as they use one side of their body more than the other. By implementing a balance program that emphasizes two leg balance exercise these strength asymmetries can be solved and

provide faster and stronger muscles to tennis athletes. This study is relevant to the clinical question proposed in this critical appraisal as the study focuses on young tennis players with lower-limb functional asymmetries and compares balance training to sport specific training. The study implies that reducing these functional asymmetries can reduce injury, which would answer the clinical question.

The research conducted in this study provides a new strategy for training young athletes and possibly even athletes across all ages. The benefits of balance training are improvements in muscular strength, endurance, and coordination. This study shows that balance training can also decrease lower-limb functional asymmetries, which results in a lower incidence of injury. By doing so, athletes can remain healthy and continue to develop their skills in their particular sport instead of having to spend time rehabilitating an injury. The potential risk for balance training is the chance that a patient or athlete can fall as the limits of stability are pushed but with proper safety precautions and training this can be avoided. If the proper steps are taken to ensure the patient or athlete's safety the benefits far outweigh the risks for balance training over sport specific training. To further improve the argument for using balance training more research could be done to prove by what percentage decreasing lower-limb functional asymmetries can prevent injury.

This study is written well and is clear as to the result of the findings, however two problems exist. The clinicians were not blinded and the statement that decreasing functional asymmetries in the lower-limbs can prevent injury is accepted to be true and not explained in this article. The prior research done on the subject is cited in the article but an explanation as to why this decreases the likelihood of injury would be of benefit to the reader. The results however are promising and the functional outcome measures are highly objective. The possible benefits also

outweigh the possible risks. The results from this article give me enough confidence to apply balance training to young athletes training programs in an effort to decrease lower-limb functional asymmetries and reduce the chance of injury.

The goal of this critical appraisal is to assess the quality and validity of the research study "Balance Training Exercises Decrease Lower-Limb Strength Asymmetry in Young Tennis Players" written by Sannicando, et al. This study has strengths and weaknesses, as does any research study. The introduction, methods, results, and discussion are all written well and contain most elements of a quality research article. This article is a good foundation for future research in this area.

Works Cited

Sannicandro I, Cofano G, Rosa RA, Piccinno A. Balance training exercises decrease lower-limb strength asymmetry in young tennis players. *J Sports Sci Med*. 2014;13(2):397-402. Published 2014 May 1.